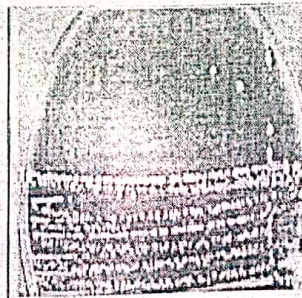


Ahmed Mustafa  
F17-011

Neisseria gonorrhoeae

A 19-year-old male presents at his doctor's office with a urethral discharge and pain upon urination. The patient is sexually active and admits to having unprotected sex with several different partners over the last 6 months. The urethral discharge was examined directly by Gram stain and microscopy. The Gram-stained sample and culture appeared as shown. The following biochemical test was also positive.



Positive

Negative

1. What is the most likely bacterium and the disease? *Neisseria gonorrhoeae*
2. What is the morphology of the Gram-stained bacterium shown? Gram <sup>+</sup> diplococci
3. Name this biochemical test and give its principle. (Oxidase test) inside the neutrophil
4. What is the mode of transmission of this disease? Transmitted sexually.
5. What are the virulence factors?
6. What is the pathogenesis of the disease? ✓
7. What are the disease caused by this organism in newborns and women? ✓ (clinical findings)
8. Discuss the laboratory diagnosis of this organism.
9. Enlist the antibiotics used for its treatment.
10. Enumerate the differences between two neisseria species.

1. The patient most likely has gonorrhoea caused by *Neisseria gonorrhoeae*.
2. Gram-negative diplococci inside the neutrophils.
3. Oxidase test.

## Oxidase Test

### Principle:

Determines the presence of bacterial enzyme cytochrome oxidase.

Cytochromes are iron containing hemoproteins and in aerobic respiration they transfer electrons (H<sup>+</sup> ions) to form water.

*cytochrome oxidase test :-*

The cytochrome oxidase test uses certain reagent dyes such as p-phenylenediamine dihydrochloride, that substitute for oxygen as artificial electron acceptors.

In the reduced state the dye is colourless; however in the presence of cytochrome oxidase and atmospheric oxygen, p-phenylenediamine dihydrochloride is oxidized forming indophenol blue.

4. Sexual route
5. Pili (fimbriae), POR Proteins, Rmp Proteins, Lipooligosaccharide, Ferric binding Proteins, IgA Protease
6. **Transmitted sexually.** Attacks mucous membranes of genito-urinary tract, eyes, rectum & throat. Produce acute suppuration (pus).....Tissue invasion.....chronic inflammation.....fibrosis  
Newborns catch infection during birth from: birth canal.
7. Endocervicitis, salpingitis, fibrosis, obliteration of fallopian tubes, infertility.  
Bacteremia occurs & may cause skin lesions, tenosynovitis, arthritis, endocarditis, meningitis, eye infections. If untreated: cause Pelvic inflammatory disease (PID) DGI.  
Ophthalmia neonatorum: Infections of newborns eye, acquired during passage through birth canal. Marked purulent discharge from both eyes, Pain, Tenderness, Swollen eye lids. If untreated ----- (blindness).
8. **Microscopy:** Gram Staining: Gram positive diplococci in the neutrophils.  
Cultured on Chocolate agar & Modified Thayer-Martin medium. Incubated in 5% CO<sub>2</sub> at 37°C. (Medium has vancomycin, amphotericin B, Colistin, Trimethoprim to prevent overgrowth of flora & contaminants).  
Biochemicals: Dnase Negative, Glucose fermenter, Oxidase Positive.

*Pelvic Inflammatory Disease*

*Blindness*

*is the result of gonococcal infection from the mother during the passage through the birth canal.*

*ans*

Serological Tests: Slide agglutination test positive

9. Resistance developed for: Penicillin, Tetracyclines, Flouroquinolones.  
Uncomplicated genital or rectal infections treated by: Ceftriaxone, Cefixime, Azithromycin.

10.

### Differences Between

#### *Neisseria meningitidis* (Polysaccharides)

- Capsulated
- Have plasmids
- Present in upper respiratory tract, cause meningitis
- Found in association within or inside neutrophils
- Rarely contain bacteriophage
- Maltose fermenter
- Enter through respiratory tract or airborne droplets
- Vaccines available

#### *Neisseria gonorrhoeae* (No polysaccharides)

- Non-capsulated
- Rarely contain plasmids
- Cause genital infections i.e. gonorrhoea
- Found extracellularly
- Commonly contain bacteriophage
- Maltose non-fermenter
- Enter through genital tract by sexual contact
- No vaccines

### Characteristics.

- Both diplococci, kidney bean shaped.
- Oxidase positive
- Glucose fermenter
- Non motile